CODE EXERCISE

🚀 Mastering JavaScript Prototype and Inheritance! 🚀

CODING EXERCISES TEST YOUR SKILLS

🚀 Mastering JavaScript Prototype and Inheritance! 🚀

Calling all JavaScript developers! Let's dive deep into the world of prototypes and inheritance with these 10 insightful exercises. 🌟💻

Prototypes and inheritance are at the core of JavaScript's object-oriented nature. These exercises are designed to help you understand, practice, and master these fundamental concepts. 🧬👨‍💻👩‍💻

Here's a sneak peek of what you'll explore:

- Prototype Chains and Property Lookups
- Overriding Prototype Properties
- Adding Methods to Prototypes
- The constructor Property
- Checking Instances with instanceof
- Extending Built-In Objects
- Prototype Inheritance
- Adding to Prototypes Inside Constructors
- Determining Prototype Chain Length

Whether you're new to JavaScript or a seasoned pro, these exercises provide valuable insights into how objects inherit and share behavior in JavaScript. 💡🌐

Exercise 1: Understanding Prototype

Problem Statement:

Create an object and add a new property to its prototype.

Hint/Explanation:

Every JavaScript object has a prototype. A prototype is also an object. All JavaScript objects inherit their properties and methods from their prototype.

Solution:

```
const obj = {};
Object.prototype.greet = 'Hello';
console.log(obj.greet); // "Hello"
```

Exercise 2: Prototype Chain

Problem Statement:

Create a prototype chain and access a property from the highest level prototype.

Hint/Explanation:

In a prototype chain, properties are looked up step by step from the immediate prototype up to the Object prototype.

Solution:

```
function Grandparent() {}
Grandparent.prototype.familyName = "Smith";

function Parent() {}
Parent.prototype = Object.create(Grandparent.prototype);

function Child() {}
Child.prototype = Object.create(Parent.prototype);
```

```
const child = new Child();
console.log(child.familyName); // "Smith"
```

Exercise 3: Overriding Prototype Properties

Problem Statement:

Create an object and override one of its inherited prototype properties.

Hint/Explanation:

Properties directly on an object take precedence over those on its prototype.

Solution:

```
function MyObject() {}
MyObject.prototype.color = "red";

const obj = new MyObject();
console.log(obj.color); // "red"

obj.color = "blue";
console.log(obj.color); // "blue" (overridden)
```

Exercise 4: Prototype Method

Problem Statement:

Add a method to an object’s prototype and call it on an instance of the object.

Hint/Explanation:

Methods added to an object's prototype are accessible to all instances of that object.

Solution:

```
function Animal(name) {
   this.name = name;
}

Animal.prototype.speak = function() {
   return `${this.name} makes a noise.`;
};

const dog = new Animal("Dog");
console.log(dog.speak()); // "Dog makes a noise."
```

Exercise 5: Constructor Property

Problem Statement:

Examine and explain the constructor property of an object.

Hint/Explanation:

The constructor property references the constructor function that created the instance.

Solution:

```
function Person(name) {
   this.name = name;
}

const person = new Person("Alice");
console.log(person.constructor === Person); // true
```

Exercise 6: Checking Instance of a Prototype

Problem Statement:

Check if an object is an instance of a specific constructor function.

Hint/Explanation:

The instanceof operator tests whether the prototype property of a constructor appears anywhere in the prototype chain of an object.

Solution:

```
function Car() {}

const myCar = new Car();
console.log(myCar instanceof Car); // true
```

Exercise 7: Extending Prototype Functionality

Problem Statement:

Extend the functionality of a built-in JavaScript object using its prototype.

Hint/Explanation:

You can add new properties or methods to built-in JavaScript constructors like Array, Object, String, etc.

Solution:

```
String.prototype.shout = function() {
   return `${this.toUpperCase()}!`;
};

console.log("hello".shout()); // "HELLO!"
```

Exercise 8: Prototype Inheritance

Problem Statement:

Create two constructor functions, with the second one inheriting from the first one's prototype.

Hint/Explanation:

Prototype inheritance allows an object to inherit all the methods and properties from another object.

Solution:

```
function Vehicle(type) {
```

```
    this.type = type;
}

Vehicle.prototype.start = function() {
    return `Starting a ${this.type}`;
};

function Car() {
    Vehicle.call(this, 'car');
}

Car.prototype = Object.create(Vehicle.prototype);
Car.prototype.constructor = Car;

const myCar = new Car();
console.log(myCar.start()); // "Starting a car"
```

Exercise 9: Adding to Prototype in Constructor

Problem Statement:

Add a method to an object's prototype inside its constructor function.

Hint/Explanation:

While not a common practice, it's possible to add methods to an object's prototype inside the constructor function.

Solution:

```
function Box() {
    Box.prototype.open = function() {
        return "Opened the box";
    };
}

const box = new Box();
console.log(box.open()); // "Opened the box"
```

Dive into these exercises, challenge your skills, and share your solutions or insights. Let's discuss how prototypes and inheritance impact your JavaScript development. If you have questions or additional tips, feel free to join the conversation in the comments below. Happy coding! 🚀🤝

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